THE RH7 HISTORY GROUP

LIMEBURNING

Chalk is a form of calcium carbonate which when burnt at about 900 degrees C becomes quicklime (calcium oxide).
If water is added it becomes slaked lime (calcium hydroxide).
Lime putty is made by adding an excess of water to quicklime.
Hydrated lime was being made at most limeworks by the 1950s.

Lime putty was used for mortar and plaster, the slaking being done on site.
Slaked lime is used as a fertilizer, restoring calcium to the soil, and for building.
Quicklime has less pleasant associations, being used to dispose of bodies, particularly in plague pits.

Limeburning
Limeburning goes back to prehistory. In Britain it was done in Roman times to provide mortar. There are Saxon references to lime and mortar and in the 12th century walls were whitewashed with lime. It was often made in pits and clamps using a method akin to charcoal burning and little evidence has been left.

By medieval times limekilns were used to produce lime for mortar and by the 16th century there is specific reference to lime being used to improve the soil. This may have been raw chalk or marl and possibly the first reference to a kiln for agricultural lime was in 1603. Up until the 18th century limekilns were temporary structures, built for immediate demand and then allowed to collapse or to be partly rebuilt for the next firing. The agrarian revolution of the 18th century caused an enormous demand for lime and a vast number of kilns were built. Some kilns from this period are still standing. In some areas farmers had their own. If it was relatively easy and economically viable to have chalk delivered from the quarry they made their own lime. Canals later improved transport.

The industrial revolution resulted in blocks of kilns being built, capable of continuous production.

By the 20th century mass production had become concentrated at the larger limestone quarries and chalk pits, with economical distribution being made by the railways. The introduction of Portland cement reduced the demand for simple lime mortar.

Surrey
With the parallel lines of the North Downs and the Greensand Surrey has produced firestone, hearthstone and chalk for many centuries. As long ago as 1359 John and Philip Prophete were appointed masters of the quarries at Merstham and Chaldon. They were given Letters Patent to dig stone for Windsor Castle and the sheriff was given powers to take any necessary action against any who 'refused to assist in the work'.

In 1805 the best limestone pits in the county - possibly 'in the kingdom' - were considered to be at Dorking. The chalkstone quarries then worked were at Godstone, Caterham, Reigate, Merstham, Buckland, Effingham, West Horsley, Clandon, Guildford and Puttenham.

To produce lime six loads of chalk were needed per kiln and this would cost 15/- to 21/-, but the cost to the customer was between £10 and £15, representing the cost of fuel and, particularly, that of transport. The railways brought this price down, but it was still cheaper for farmers near chalk pits to have the raw material delivered and make their own lime.

Old maps indicate the presence of kilns used by farmers, as do names of fields and woods. In the Lingfield area they are shown at the entrance to Weir Courtney along Blackberry Lane, at the Workhouse site in Newchapel Road, in 1730, plus another further along, also near the entrance to Lyne House Farm (1877 - this may mean the name is a corruption of 'Lime'), Barrow Green Farm (1863), Comforts Place Farm, Tandridge Lane, and on the site of the Almshouse, Dormansland. There are two shown at Crowhurst Lane End and another at White House Farm, Staffhurst Wood. The dates are not meant to indicate the age of the kiln but only indicate their existence. Neither is the list exhaustive. There may well have been many more.

No evidence has been found at the sites explored, which were extremely overgrown, but it is sometimes possible to find heaps of rubble and the shallow hollow in the ground. The kilns were probably the typical field, or flare, kiln, built into slopes or roadside banks.

The kilns had sandstone walls, brick lining for the pot and in a front wall a single arched draw-hole. A ledge ran round the inside and a wooden frame or iron horse helped the formation of the initial load of chalk, which would form a dome. Smaller pieces of chalk were added. A fire was lit under the dome, a modest heat first to dry and set the charge, then a fierce heat was applied until calcining was complete in 24 to 36 hours, indicated by a clear red fire at the top. After a lengthy cooling period the lime was drawn out. Long handled tools were used for raking and clearing ashes. The complete operation took probably four or five days. The fuel could be a mixture of coal and wood, but locally, in a wooded area, it would be brushwood, coppiced wood or furze**.**

Comforts Place Farm
An accounts book dating from 1808 gives an interesting insight into farming life, and also gives details regarding lime burning.

An ‘account of chalk’ records that on April 23rd, and 26th-29th inclusive, 1 load of ‘white nobs’ were delivered on each day, as they were also on the 10th May, 7th to 9th June, 26th July and August 10th. £2 was the cost for the total consignment. On May 2lst ‘carrying kiln faggots’ is also listed, at 4/-.

Then there is an ‘account of lime laid’. June 23rd - two fields covered – ‘Do one kiln’. August 27th – ‘1 kiln for 10 acres’. September 21st – ‘1 kiln for 10 acres, except for one load for liming wheat’.

In 1809 the procedure was the same except that in July reference is made to ‘7 loads laid out upon fields - 1 kiln for 4 acres. 25 bushels Mr Woodroffe had’. In 1810 a batch is reserved for bricklaying

Oxted Chalk Pits

A Company was incorporated to run the Chalkpits in 1885. In 1932 it was owned by the Oxted Greystone Lime Company and was then taken over by the Dorking Greystone Lime Company who also owned Merstham, Brockham and Betchworth. In 1993 it was owned by Tilcon but operations were confined to the west side of Chalk Pit Lane. It was still serving agricultural needs but by the late 1990s it had become a landfill site.

In 1994-5 the Surrey County Archaeological Unit carried out a project to examine and record the main battery of eleven draw kilns, which produced lime by a continuous process, unlike those which they replaced which produced lime in single batches and needed to be loaded, fired, cooled and unloaded with each process.

It is not known if they were flare kilns (i.e. fuel and chalk were kept separate as with the method the farmers used) or whether they were the type where fuel and chalk were packed in layers.

A draw kiln has an open top. Chalk lumps in a mass, and the fuel, are packed from the top and fired from the hearth at the bottom. Once started the fire is self-sustaining and continuous as long as chalk and fuel are added from the top. Draw bars housed in a slot formed by iron girders above the hearth are removed to allow the lime to be drawn off continuously..

Unfortunately, unlike Dorking, Betchworth and Brockham there do not seem to be any surviving records. However, by the 1930s all four quarries were part of the Dorking Greystone Lime Co. and it is reasonable to suppose that administration, wages, conditions, regulations etc. were the same for all..

An annual return had to be made for each quarry and in 1939 Betchworth quarried 23,904 tons of chalk with a net selling value of £1,195.

In 1944 a provisional estimate for new plant and machinery was:
4 new kilns - £4,500
Hydration Plant - £10,000

Grinding Plant - £1,700
Steel building - £40

Chalk pits were regulated under the Quarries Act 1894 and the Factory and Workshop Act 1901. All accidents had to be recorded and in the Returns there are incidents such as crushed hands, falling from ladder whilst repairing a kiln, a lime burner being injured by a fall of chalk, another injured with lime dust on the face. Another fell whilst loading a kiln. The accident was described as 'slight' (as they all were) but 'shock followed' and the Inspector had to be informed. It was three months before the man could return to work.

With regard to wages in the Annual Report of 28th March 1944 the total number of workers over 21 is shown as 23 and the total wages as £211.16.9. There are 4 workers under 21 and the total wages are shown as £12.9.5. There is no indication of the way wages may have differed regarding the type of work done. There were no part time workers and no mention is made of the amount earned by the salaried staff who seemed to be 4 or 5 - 1 female, the rest male.

Land Fertility Scheme
In June 1937 an Act was passed proposing that the use of lime to improve soil fertility should be subsidised by the Government by 50%. It would apply to farmers, smallholders and also to allotment holders if they could form groups large enough to justify ordering in 2 ton loads.

The regulations were that there was no contribution for lime produced outside the UK, that the lime had to be used for agriculture only, could not be supplied in less that 2 ton amounts and private gardens were not eligible.

Again, there were the forms to fill in - the approved supplier had to fill in Part l, then send it with part 2 to the applicant. When he had completed his section it had to be sent back to the supplier who had to complete the application and send it to the Land Fertility Committee. The extraordinary thing about all of this was the reaction of the press who seemed to regard the liming of the land as a new scientific wonder rather than a continuation of a practice going back centuries.

© Mavis Priestley
May 2006

Sources:
Victoria County History: Surrey Vol. 2
Lime Kilns and Limeburning - Richard Williams - Shire Publications
Papers at the Surrey History Centre, Woking
Oxted Chalkpit Project - Surrey County Archaeological Unit